CHEMINSTRUMENTS

HOT MELT DRAWDOWN COATER
MODEL HLCL-1000
OPERATING INSTRUCTIONS

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PRODUCT DESCRIPTION

Congratulations on the purchase of your new ChemInstruments Holt Melt Coater. You now have a small, versatile coater that allows you to coat hot melt adhesives on any substrate without having to use the large quantities necessary for production equipment.

The unit has the following features:

- Heats up to 400 ^{o} F.
- Two precision ground, stainless steel coating bars.
- Separately heated coating bars and back dam.
- Can use “pre-melted” adhesives or the coater can melt the adhesive.
- Three Fenwal Temperature Controllers with digital read-outs.
- Each heating rod has its own internal thermocouple
- Unwind stand
- Can coat continuous samples up to 12” wide.
- Adaptable to 240 VAC

Upon receipt of a new ChemInstruments Hot Melt Coater, there are some steps that should be followed in setting up the system. Following these steps will help to extend the life of the unit and also help achieve better, more consistent results.

UNPACKING

Check the unit for any damage that might have occurred during shipment. Very little damage has been experienced in the past, however, make sure the coating bars have not been scratched or nicked. If any damage did occur during transit, notify the **carrier** immediately.

KEY COMPONENTS

The ChemInstruments HLC-100, HLC-101 consists of the following parts:

- An envelope with this manual
- Control box with 3 heating rods coming from back panel.
- Coating head with 2 stainless steel coating bars.
- An unwind mounting base. Includes 3 flathead and 2 button head screws.
- An unwind upright assembly.
- An aluminum rod for holding the roll of substrate.
- Two Teflon side dams.
- Two thickness gauges.
- One Fenwal Instruction Manual

Make sure all of these components are present before discarding the packaging material.

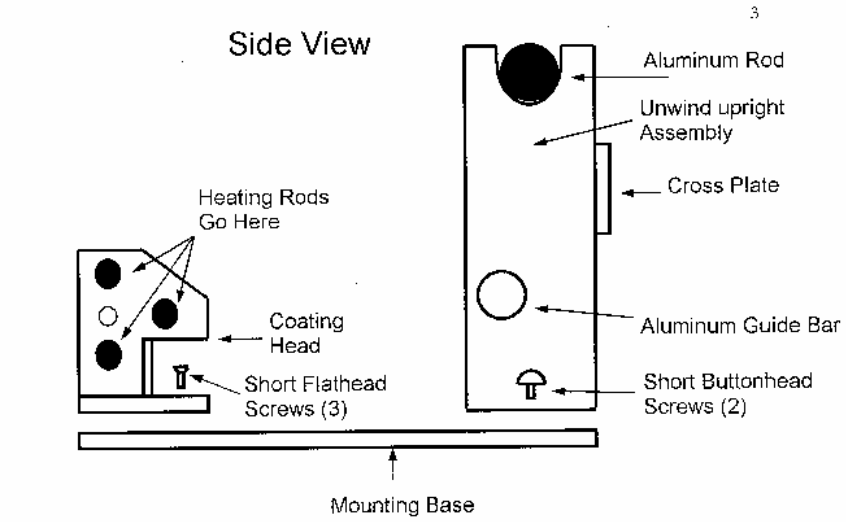
FENWAL INSTRUCTION MANUAL

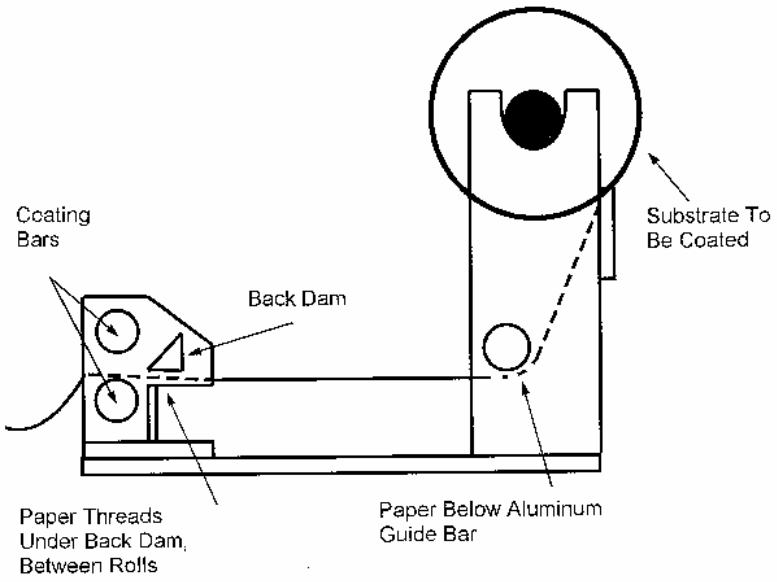
NOTE: The ChemInstruments Hot melt Coater has been fully factory tested, and is ready for operation. There is no need to program the Fenwal Temperature Controllers. The Fenwal Instruction Manual is included only as a reference for customers with special application.

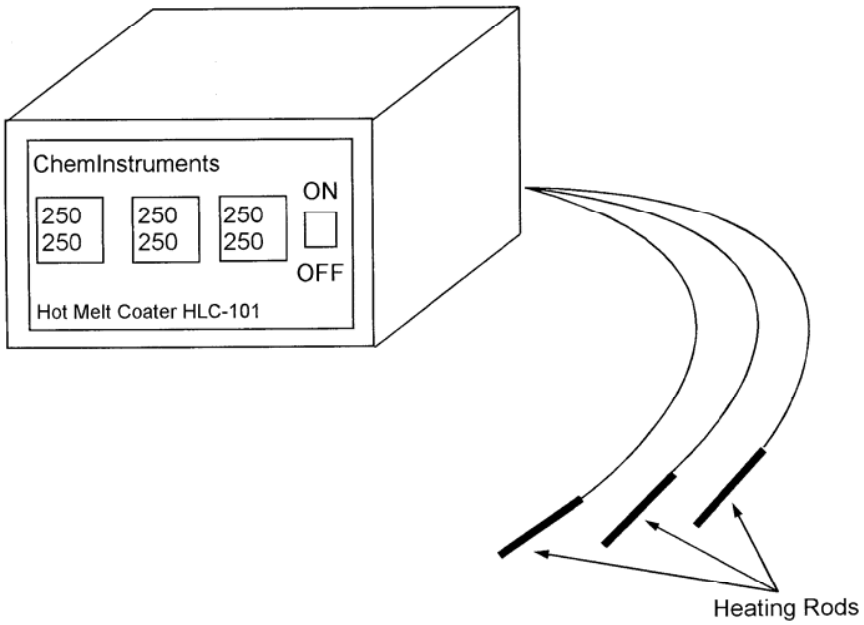
The coater should be set up in an area that has at least 24 inches of vertical space, access to back of the unit, and has a 115 VAC outlet nearby (or 220 VAC if the Hot Melt Coater is wired for that voltage). Leave plenty of room in front of the coating head so the sample may be pulled at a downward angle.

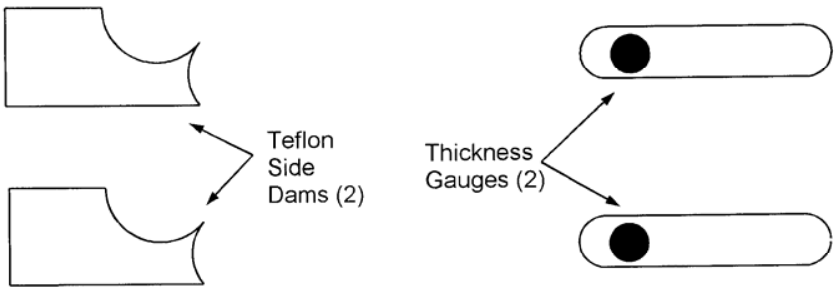
WARNING

The coating bars are precision ground stainless steel. They are manufactured to a very high tolerance to ensure quality coatings. Handle the coating bars with extreme caution, using only a soft cloth to clean or move. Do not set the bars down on a hard surface – use a soft cloth as a protective layer.


Side View
Aluminum Rod
Unwind upright Assembly
Cross Plate
Heating Rods Go Here
Coating Head
Aluminum Guide Bar
Short Flathead Screws (3)
Short Buttonhead Screws (2)
Mounting Base


Coating Bars
Back Dam
Substrate To Be Coated
Paper Threads Under Back Dam, Between Rolls
Paper Below Aluminum Guide Bar


ChemInstruments
250
250
250
250
250
250
ON
OFF
Hot Melt Coater HLC-101
Heating Rods


Teflon
Side
Dams (2)
Thickness
Gauges (2)

ASSEMBLY

The Hot melt Coater has several different parts that need to be assembled before the coater can be used. Refer to pages 5 and 6 for illustrations.

1. Attach the unwind upright assembly to the mounting base with the short button head screws provided. The screws will screw into nuts, which are permanently mounted on the bottom of the mounting base. The cross plate on the unwind upright assembly should be toward the rear of the machine and the aluminum guide bar should be toward the coating head.
2. Place the coating head on the mounting base, lining up the holes in the base plate of the coating head with the holes in the mounting base. Attach the coating head to the base with the short flathead screws provided. The screws will screw into nuts, which are permanently mounted on the bottom of the mounting base.

MAKE SURE TO REMOVE ALL STRAPPING, PROTECTIVE WRAPPING, ETC. FROM THE COATING BARS BEFORE TURNING THE MACHINE ON!!

3. Slide the heating rods into the holes in the side plate of the coating head. One rod should go into each of the following places: top coating bar, bottom coating bar, and back dam. The rods are labeled and should be placed in the appropriate location. The individual heating controllers are labeled to match certain heating rods, so proper placement is important. *NOTE: The heating rods may be discolored due to final testing at our factory.*

OPERATION

THEORY OF OPERATION

The ChemInstruments Hot Melt Coater allows thorough evaluation of formulations without the expense of full scale production.

POWER UP

Turn the power on, with the master switch located on the front panel.

" Warning! Operating temperature for this equipment is 0 to 70 Celsius. The equipment needs to be completely free of condensation inside and out, before applying power."

CONTROLLER OPERATIONS

The heating controllers are preset and tested at the factory before shipment. They are ready to begin operating as soon as the power switch is turned on. The actual temperature of the coating bars or back dam are the process values, and are displayed on top of each controller, under PV. The desired temperature is the set point, and is displayed on bottom, under SP. The green lamp labeled OUT will light when the coating head is being heated. AL1 and AL2 are alarms that are not used with this unit. The AT lamp is lit during auto-tuning. ***This has already been done at the factory and should not be repeated.***

When the power switch is first turned on, the two displays of each controller will display preset parameters for the first four (4) seconds. This will include whether the display is set for Fahrenheit or Celsius and the maximum and minimum set point values. The display will then automatically change to display the process value and set point. This is the normal operating mode.

To Change the set point:

1. Press the SET/ENT button. The least significant digit on the set point display will be brightly lit.
2. Use the up and down arrow buttons to adjust the value of this digit.

3. Press the left arrow button to select the next digit. The brightly lit digit is selected, and can be changed.
4. When the desired value is entered, press SET/ENT again to save this value and return automatically to the normal operating mode.

NOTE: When no buttons are pressed for a period of one (1) minute, the controller returns to normal operating mode automatically, Press SET/ENT again to continue changing the set point is desired.

After turning on the heater and changing the set points, allow the unit to stabilize. The factory has tested the unit at 250° F, and it usually takes 45 minutes to an hour for the unit to fully stabilize.

CAUTION

Once the heater is turned on, the temperature will rise very quickly. The 45 minutes mentioned above is the time for full temperature stabilization, not the time needed for the coating head to come up to temperature!!

NOTE: When you first turn on the power, you may notice the smell of burning oil. This is normal as oil is used as a colling agent when boring the holes in the coating bars.

NOTE: It is very important to let the machine run for 45 minutes after each adjustment to allow the temperature to stabilize.

CAUTION

Allow the coating bars, the back dam, and the heating rods to cool to room temperature before touching !!

TOUCHING HOT COATING BARS, BACK DAM, OR HEATING RODS WILL CAUSE SEVERE INJURY!!

COATING OPERATION

The following is the correct procedure for coating hot melt adhesive samples:

1. Slide the aluminum rod through the roll of substrate and set the rod in the notches in the unwind upright assembly.
2. Pull the end of the substrate down, between the cross plate and the aluminum guide bar.
3. Remove the dams, back dam, and top coating bar. NOTE: *Lay the top coating bar on a soft cloth to avoid scratching the bar. Scratches on the coating bar surface will affect the quality of the coating.*
4. Pull enough substrate out so that it extends 4" to 5" beyond the end of the mounting base.
5. Make sure the bottom-coating bar is firmly seated, and then tighten the thumbscrews holding the bar in place.
6. Lay the substrate over the bottom-coating bar.
7. Replace the back dam.
8. Replace the top coating bar.
9. Place the Teflon side dams in the reservoir with the Lang, flat surface on top of the back dam. The bottom surface of the dams should be at a 45-degree angle with the larger cutout facing up. Lift the top coating bar slightly and slide the Teflon dams underneath, with the top bar resting on the larger cutout.
10. Using the thickness gauges, one at each side of the coating head, set the spacing between the two bars to the desired distance and tighten the thumbscrews holding the top coating bar in place.
11. Insert the heating rods.
12. Turn the power on. (SEE CONTROLLER OPERATION FOR DETAILS.)
13. Set the controllers to the desired temperatures and allow the unit to stabilize.

NOTE: Three separate controllers allow temperature control of individual parts of the coating head. By adjusting the controllers separately, the coating process can be fine-tuned.

NOTE: If overshoot becomes a problem, adjust the set point for 20 degrees below the desired process value. When the coater has stabilized at this temperature, increase the set point to the desired value and allow the unit to stabilize.

14. Add the “pre-melted” adhesive to the back dam.

NOTE: Although using a “pre-melted” adhesive is the preferred approach, the adhesive can be melted in the coater. Temperature sensitive webs may be damaged when melting adhesive in the coater because the web may be exposed to heat for an excessive period of time.

15. Pull the substrate through the coating bars at a downward angle of about 15^{o}. Pulling the sample at a downward angle will eliminate the smearing of the adhesive on the freshly coated sample and provide an accurate coating thickness.
16. Pull the sample to desired length or until the adhesive runs out.

CAUTION

COATING BARS ARE HOT!! PULL ENOUGH SUBSTRATE THROUGH TO ALLOW YOU TO CUT THE SAMPLE 4” TO 5” BEYONG THE COATING BARS.

17. Cut the sample with a razor knife.

MAINTENANCE

The ChemInstruments Hot Melt Coater is a very simple machine. It requires very little maintenance. However, the machine requires a thorough cleaning after every use. The coating bars are precision ground and must be kept clean to repeatedly provide quality coatings.

CLEANING

After finishing the coating job, turn off the controller and allow the unit to cool. When the coatings bars are cool, disassemble the coating head. **The heating rods may still be warm**

even though the coating bars are cool!! If possible, soak the bars, dam, and back dam in solvent overnight.

NOTE If it is necessary to scrub the coating bars, use only a *soft* cloth. The bars are precision ground and any scratches to the surface will affect the accuracy of the coatings.

The nature of some adhesives may make it necessary to clean the unit while it is still warm. **USE EXTREME CAUTION IF IT IS NECESSARY TO CLEAN THE UNIT WHILE IT IS STILL WARM!!**

TROUBLESHOOTING

PROBLEM	PROBABLE CAUSE	PROCEDURE
Power switch not lit	Machine not plugged in	Plug machine into 120 VAC outlet.
	Blown fuse.	Replace with a 15-amp fuse.
Controller displays "LBA"	Thermocouple wires loose or disconnected	Check connections inside control box. (SEE BELOW – A)
	Heating rod thermocouple bad.	Replace heating rod. Call ChemInstruments
Green OUT lamp let, PV not increasing, but coating head temperature is increasing	Controller is bad.	Replace controller. Call ChemInstruments

Green OUT lamp lit, PV not increasing, coating head temperature not increasing.	Heating rod wires loose or disconnected.	Check connections inside control box. (SEE BELOW – B)
	Relay loose or bad.	Check relay and replace if necessary. (SEE BELOW – C)
	Controller is bad	Replace controller. Call ChemInstruments

UNPLUG THE MACHINE BEFORE ATTEMPTING MAINTENANCE PROCEDURES!! ELECTRIC SHOCK MAY OCCUR IF THE MACHINE IS PLUGGED IN.

To remove the back pane, remove the six allen head screws holding the panel in place. *Carefully* lower the panel making sure not to pull any wires loose from their connections!

A. THERMOCOUPLE CONNECTIONS

1. Each heating rod cable contains four wires. The thermocouple wires are the small red and white wires. The red wires should be connected to terminal 8 on the back of a Fenwal heating Controller.
2. The white wires should be connected to terminal 9. Check all six connections.
3. Replace the back panel making sure not to pinch any wires.

4. If “LBA” is displayed on the front of a Fenwal Temperature Controller, this means there is a break in the thermocouple connection for that controller. If the above connections are not bad, then the internal thermocouple must be bad, and the entire heating rod must be replaced.

NOTE: The thermocouple wires are solid wire, making it easy to break or crack if bent too severely. When checking these connections, be gentle with this wire.

B. HEATING ROD CONNECTIONS

1. Each heating rod cable contains four wires. The two larger wires are hot and neutral. The hot wires from each of the rods are connected to a red butt splice, which has a yellow wire running to terminal 6 of the relay sockets.
2. The remaining neutral wire is connected to a blue butt splice, which has a white wire running to terminal 7 of the relay sockets. This white wire is connected to all heating rods, all controllers, and all relay sockets through a series of blue butt splices. If one of these connections is loose, the rods will not heat up.
3. Make sure these connections are tight.
4. Replace the back panel making sure not to pinch any wires.

C. REPLACING THE RELAY

1. The relays are the clear plastic boxes. First check to make sure each relay is firmly seated by pushing down gently.
2. If the relay doesn’t move, continue with replacement. If it does move, firmly seat the relay, reassemble the unit, and test.
3. To remove a relay, wiggle it in a circular motion while gentle pulling it out of the socket.

4. Install a new relay by lining up the tab on the plastic post on the bottom of the relay with the mating part in the socket. Push it firmly into the socket.
5. Replace the back panel making sure not to pinch any wires.